ALBERTA H[illegible]AGE FOUND[illegible] FOR MEDICAL RESEARCH

ahfmr news

nursing research

On the Cover

Registered nurse **Shirley Cole** is shown here with **Maggie May** and **Goldie Rayne**. The cover photo was shot by Calgary photographer Trudie Lee whose work is regularly featured in *AHFMR Research News*.

research news

ALBERTA HERITAGE FOUNDATION FOR MEDICAL RESEARCH

SUMMER 2005

Shoulder pain

Shoulder pain is a fairly common problem but much about its diagnosis and treatment is still unknown. Dr. Ian Lo hopes to change that.

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Crohn's and colitis are more common in Canada than almost anywhere else in the world. Dr. Paul Beck studies these diseases of the gut.

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AHFMR Mission

AHFMR supports a community of researchers who generate knowledge whose application improves the health and quality of life of Albertans and people throughout the world. AHFMR's long-term commitment is to fund health research based on international standards of excellence and carried out by new and established investigators and researchers in training.

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AHFMR
ALBERTA HERITAGE FOUNDATION FOR MEDICAL RESEARCH

25 YEARS OF EXCELLENCE

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The nurse as caregiver is a concept and image with which we're all familiar. But the role of the nurse is constantly evolving and expanding to include responsibilities many of us don't traditionally associate with the nursing profession—responsibilities like research.

While nursing itself is a very old health discipline, the nurse researcher has a fairly short history; only in the past few years have nurses really begun to develop strength in independent research. Now nursing programs at Alberta's three universities are building areas of focus to capitalize on their research strengths.

The University of Alberta has played an important role in the evolution of nursing research. In 1991 it established the country's first funded Ph.D. nursing program, and its graduate school in nursing is the largest in Canada. Faculty of Nursing dean Genevieve Gray has spent the past few years building the faculty's research capacity and working to integrate teaching and research more closely. The faculty now concentrates its research efforts within five areas of excellence: global health; health systems and services; evidence-based clinical practice; innovative learning environments; and population health. "This model has helped us to clarify where our strengths are, how we recruit faculty, and where we need to build," says Gray.

Alberta's three universities are building on their nursing research strengths.

The model also helps communicate nursing research to people within other disciplines, to the university at large, and to the public—an ongoing challenge. "People mainly see nurses in practice at the bedside, and that's the role they understand," she explains. "But nursing research can have a tremendous impact on people's lives. It's about making a difference to the experience people have with healthcare-delivery systems. Research is so important to nurses, because we need to know why we're doing things, and our practice needs to be based on evidence. It can't just be because we've always done it that way, if it's not going to improve the outcomes for the patient."

At the University of Calgary's Faculty of Nursing, associate dean of research Dr. Sheila Evans identifies similar challenges. "My major focus has been to really concentrate on growing the research culture in the Faculty of Nursing so that research becomes one of the priorities," she explains. "In the past few years we have made a concerted effort to assist our faculty in developing strong research programs." With these goals in mind, in 2004 the faculty realigned its research efforts to focus on cardiovascular and family nursing research, as well as on two collaborative research initiatives with the Calgary Health Region: health systems research and professional education. "As nurses, we've always focused very strongly on practice and education, but we're trying to reorient our focus," she adds.

"Our practice needs to be based on evidence"

Lynn Basford, dean of the University of Lethbridge School of Health Sciences (which offers two programs in nursing) echoes these priorities.

ABOVE L TO R: DEAN GENEVIEVE GRAY AND DR. SHEILA EVANS

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"Harnessing research, learning, and practice is our core business; those are my passions," she says. Like the province's other nursing programs, the School of Health Sciences recently developed a research strategy, clustering its research into areas of strength and focus: rural and population health; primary care and public health; addiction and gaming; social disadvantage and exclusion; and innovative practice and education. "Nurse researchers have traditionally worked in an independent way, self-focused rather than building networks and centres of focus and expertise," she explains. "So often, we pour money into research that doesn't have a major impact on care."

"Nurse researchers have traditionally worked in an independent way"

ABOVE: DEAN LYNN BASFORD

responding to the reader

AHFMR frequently receives letters requesting information about Heritage research or about various medical conditions. "Responding to the Reader" is an AHFMR Research News feature intended to provide up-to-date information related to readers' questions, with the help of experts in the Alberta research community. AHFMR cannot provide medical advice, however; please see your family physician about your specific health concerns.

> A reader has asked if there is any research suggesting a link between the use of dental mercury and the development of Alzheimer's disease.

The association between mercury and Alzheimer's is a topic of interest for former Heritage researcher Dr. Naweed Syed, chair of the University of Calgary's Department of Cell Biology and Anatomy. In 2001, he and a team of researchers found that exposure to mercury caused rapid degeneration of brain nerve cells in snails. The mercury caused damage in the snail brain-cell fibres similar to that seen in human brain cells attacked by Alzheimer's disease. When the researchers repeated the mercury tests using metals such as aluminum, lead, cadmium, and manganese, they did not find the same type of cell degeneration.

But snails, as Dr. Syed has noted, are not humans. "All the data from our study provided unequivocal evidence that mercury does cause damage; but I don't think anybody has shown directly that it could really produce Alzheimer's disease in humans," says Dr. Syed. "Nobody has really looked at it extensively in higher animals or humans."

What is clear is that more research is needed. For one thing, studies must be devised around a different type of cell: In the snail study, Dr. Syed and his colleagues observed mercury's damaging effects on the developing or regenerating nerve processes of a "newly born" brain cell; in future, his team would like to look at the effects of mercury on the fully developed brain cell, where the structural integri-

Nobody has shown directly that mercury could produce Alzheimer's disease in humans.

ty of the tissue may be more stable. For another thing, although nerve processes in snails and other animals are similar to those in humans, it will also be important to repeat the snail experiments on animals more closely related to humans in order to determine whether there is a direct link between mercury in fillings and brain damage.

Meanwhile, the Canadian Dental Association and the Alberta Dental Association and College have this to say on the topic of dental amalgam: "Although amalgam in fillings releases minute amounts of mercury vapour, current scientific consensus supports the position that amalgam does not contribute to illness. It is recognized that there are individuals who are specifically sensitive or allergic to the components of amalgam, and amalgam may not be suitable for all patients and in all circumstances." The organizations advise patients to discuss the matter with their dentists, in order to choose the best type of fillings for their needs, and to stay informed about conclusions from scientific studies of dental amalgam.

Dr. Naweed Syed is a former AHFMR Scientist and is currently a full professor and head of the Department of Cell Biology and Anatomy at the University of Calgary. His research is supported by the Canadian Institutes of Health Research (CIHR) and the Natural Sciences and Engineering Research Council of Canada (NSERC).

ABOVE: DR. NAWEED SYED

As part of their publication in the April 2001 issue of NeuroReport, Dr. Syed and members of the Calgary research team developed a five-minute video that showed the effects of mercury on snail brain neurons. You can watch the video at **http://movies.commons.ucalgary.ca/showcasetv/mercury**

For further reading on dental amalgam and Alzheimer's disease, see the Canadian Dental Association's position at **http://www.cda-adc.ca/english/your_oral_health/ aq/amalgam_faqs/default.asp**

and the position of the Alzheimer's Association at **http://www.alzheimers-illinois.org/articles/fillings.html**

You may also contact the Alberta Dental Association and College at **(780) 432-1012** or **1-800-843-3848**.

Send us your reader questions!

If we respond to your question in Research News we'll send you an AHFMR t-shirt.

Calgary orthopedic surgeon Dr. Ian Lo is a man with a mission. This young physician-researcher works to help people with disabling shoulder pain. As a doctor, he specializes in treating adults with shoulder problems; and as a scientist, he researches ways of preventing shoulder pain.

Shoulder pain

"This is an exciting area," says Dr. Lo, a Heritage Clinical Investigator. "It's also a relatively unknown area in medicine. There's still a lot about diagnosis of the shoulder that's unknown."

Shoulder pain is a fairly common problem in those over 40 and also occurs in younger people following injuries. Many of the patients with shoulder pain that Dr. Lo sees at the University of Calgary Sports Medicine Clinic have rotator cuff problems, including tears and tendinosis in the shoulder.

The *rotator cuff* is a group of flat tendons (tough bands of tissue that attach muscle to bone) that surround the front, back, and top of the shoulder joint—rather like a cuff on a shirt sleeve. Tendinosis occurs when the tendon degenerates, which in turn can contribute to tears in or around the tendon.

Tendinosis occurs when the tendon degenerates.

A rotator cuff tear may occur suddenly, following a single acute injury or trauma (caused by heavy lifting, a fall, or a sports injury); a tear may also develop gradually in the course of long-term overuse (such as repetitive overhead activities like painting ceilings or pitching a baseball). Often, long-term tendon damage or degeneration is due simply to aging. Patients with rotator cuff tears may experience aching pain that worsens when they raise their arm, and they may be doing something as simple as lifting when the tendon tears away from the bone. They feel sudden pain in the shoulder which may become persistent to the point that the shoulder is painful both with and without movement. The arm may be weak, and the shoulder muscle may actually wither.

"Rotator cuff pain can be disabling, both with activity and when at rest," explains Dr. Lo. "The pain is particularly bad at night and wakes the patients. They cannot sleep on that shoulder. People

ARTWORK: JAMES NICOLL. *UNTITLED*. CONTE CRAYON ON PAPER. 45.8 X 30.5 CM. N.D. COLLECTION OF THE ALBERTA FOUNDATION FOR THE ARTS.

get to the point when they can't take the chronic pain any more. Then they go to see a doctor. Many of the patients I see have already had shoulder pain a long time. It's not uncommon for people to have suffered pain for one or two years before they see me. This makes treatment a lot more difficult."

Doctors can often treat partial rotator cuff tears without surgery. Instead, they recommend rest, ice, pain medications, and physical therapy; or they may give corticosteroid injections to control pain and improve movement and function. In some cases, however–such as when the tear completely severs the tendon, or the patient is very weak or hasn't responded to other treatments–an orthopedic surgeon will repair the rotator cuff.

The type of surgery required depends on the size, depth, and location of the tear. Dr. Lo performs arthroscopic rotator cuff repairs. In this technically challenging procedure, the surgeon inserts miniature instruments into small incisions, removing bone spurs or degenerative tissue and repairing larger tears. Surgical repair, followed by rest and rehabilitation, will usually reduce pain and improve the shoulder's strength and range of motion. In some instances, however, surgery is unsuccessful, because the tendon doesn't reattach to the bone; this typically occurs when the tendon is progressively degenerating or the tear has been there a long time. Also, in some cases, a severe rotator cuff tear will cause arthritis in the shoulder (rotator cuff arthropathy).

Preventing rotator cuff tears, or at least preventing the progression of degeneration, would help many people, Dr. Lo points out. No one knows exactly what causes rotator cuff tears, but the consensus is that such factors as genetic predisposition, tissue degeneration, and external stresses on the shoulder all contribute.

Dr. Lo is a member of a multidisciplinary research team trying to identify the specific factors that cause rotator cuff tears. This team includes two shoulder surgeons, a molecular biologist, a cell biologist, and a biomechanical engineer, all collaborating to study tendon biology. They hope to discover why and how

ABOVE: DR. IAN LO

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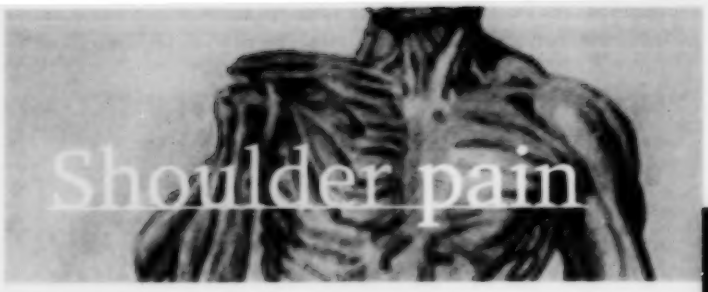
Is your pain due to frozen shoulder or a rotator cuff tear?

Shoulder pain can sometimes indicate a *"frozen shoulder"* (adhesive capsulitis). Most individuals with frozen shoulder improve with relatively simple treatments, such as physical therapy and anti-inflammatory medications, although it may take some time (up to 18 months). As with a rotator cuff tear, the symptoms are pain (usually dull or aching), loss of motion, and stiffness in the shoulder. There is a simple difference between the two conditions, however. With a rotator cuff problem, the patient has a painful shoulder but it can still move. "A frozen shoulder is painful and stiff and the patient cannot move it normally—it's actually stuck," says Dr. Lo. "Even if someone tries to help you to move it—say they try to stretch it out—it will not move." Sometimes a frozen shoulder and rotator cuff problem will overlap, and a patient will have both conditions at the same time.



Shoulder pain

Signs and symptoms of a rotator cuff tear

- Recurrent, constant pain, particularly with overhead activities
- Pain at night that prevents you from sleeping on the affected side
- Muscle weakness, especially when attempting to lift the arm
- Catching and grating or cracking sounds when the arm is moved
- Limited motion
- Occurrence (usually) in the dominant arm: right shoulder for right-handed people, left shoulder for left-handed people
- A specific incident that may be identifiable as having triggered the pain.

Source: American Academy of Orthopedic Surgeons

the rotator cuff degenerates in some individuals as they age. In particular, Dr. Lo and his colleagues aim to identify how cells communicate back and forth in tendon tissue, how the cells function, and what happens when they don't function correctly.

Dr. Ian Lo is an AHFMR Clinical Investigator and an assistant professor in the Department of Orthopaedic Surgery, Faculty of Medicine, University of Calgary. He is also a Junior McCaig Professor in the McCaig Centre for Joint Injury and Arthritis Research, and receives research support from the University of Calgary internal research grant fund and the McCaig Fund.

Selected publications

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MOST OF US LIKE TO KEEP WHAT

Diseases of

SOME THINGS ARE PRIVATE—

For many Albertans, though, such privacy is not possible. People with *inflammatory bowel disease* (IBD)—inflammation of the intestine or stomach—need to share the intimate details of these usually private moments with their doctors and other health professionals. The bathroom habits of IBD sufferers are a clear indicator of their overall health. On good days these people have no pain, and life is fairly normal. On bad days they experience painful abdominal cramps and diarrhea. On their worst days they may also suffer from additional health problems, such as fever, fatigue, arthritis, and skin problems.

Heritage Scholar Dr. Paul Beck is fascinated by what happens in the gut. As a gastroenterologist with a special interest in treating IBD, he cares for patients who have the two main forms of the disease—Crohn's disease and ulcerative colitis—which affect Canadians more than any other people in the world. He also treats patients with other diseases of the digestive tract, such as celiac disease, irritable bowel syndrome, and gastroesophageal reflux.

Dr. Beck is interested in how the gut protects itself.

Both ulcerative colitis and Crohn's disease are lifelong diseases that have a tremendous impact on quality of life, says Dr. Beck, a clinician-scientist at the University of Calgary. With ulcerative colitis, the inflammation affects only the *colon,* the lower part of the large intestine. In Crohn's disease, on the other hand, the inflammation can occur from the mouth all the way down to the anus. Both disorders can cause ulcers. IBD affects approximately 170,000 Canadians, and there is still no cure. The causes of the disorders are also unknown, although researchers believe that genes play a role.

HAPPENS IN OUR BATHROOMS IN THE BATHROOM.

the gut

VERY PRIVATE.

"Crohn's disease is a pretty devastating disease," he says. "It changes a lot of people's lives. I have a lot of young patients who are very motivated, but their disease gets in their way. Most of the time we can keep it under control. Some patients do very well: I have a couple of patients with bad ulcerative colitis and Crohn's disease who play professional sports. It's amazing.

"We're still trying to figure out what causes this disease, how to treat it, how to prevent it, and who's susceptible to developing the disease," explains Dr. Beck. "We're really still at the ground level."

That said, over the past few years treatments for IBD have improved, and new drugs have been introduced. "We treat more aggressively and keep people in remission for longer," says Dr. Beck. "They're having fewer surgeries."

A research scientist as well as an award-winning teacher, Dr. Beck has dedicated his career to studying the gastrointestinal tract, to discover what causes IBD and to find new and improved ways to diagnose, screen for, and treat the disease. The studies in his lab focus on assessing the regulation of intestinal inflammation and the processes involved in recovery following intestinal injury. He investigates cell death, wound repair, and the incidence of gastrointestinal diseases and disorders.

Dr. Beck is interested in how the gut protects itself and how it recovers after injury. He believes that many patients with inflammatory bowel disease are either more susceptible to injury than normal, or less able to heal an injury once it occurs.

"One of the projects I'm involved in right now is a study which started with one patient," he explains. The patient underwent a lung transplant at age 55 and experienced diarrhea shortly afterward. She saw a number of doctors for the problem but her biopsies and tests all looked normal. Dr. Beck became interested in the possibility that her anti-rejection medication might be affecting the gut and causing the diarrhea. On further investigation, it became apparent that her biopsies were not, in fact, normal. Her medication seemed to be causing the same kinds of changes in the intestine as occur in celiac disease.

Crohn's and colitis affect Canadians more than any other people in the world.

Dr. Beck began a review of biopsies undertaken in other transplant patients. He found that 75 of 750 patients who had been biopsied after lung, kidney, and liver transplants

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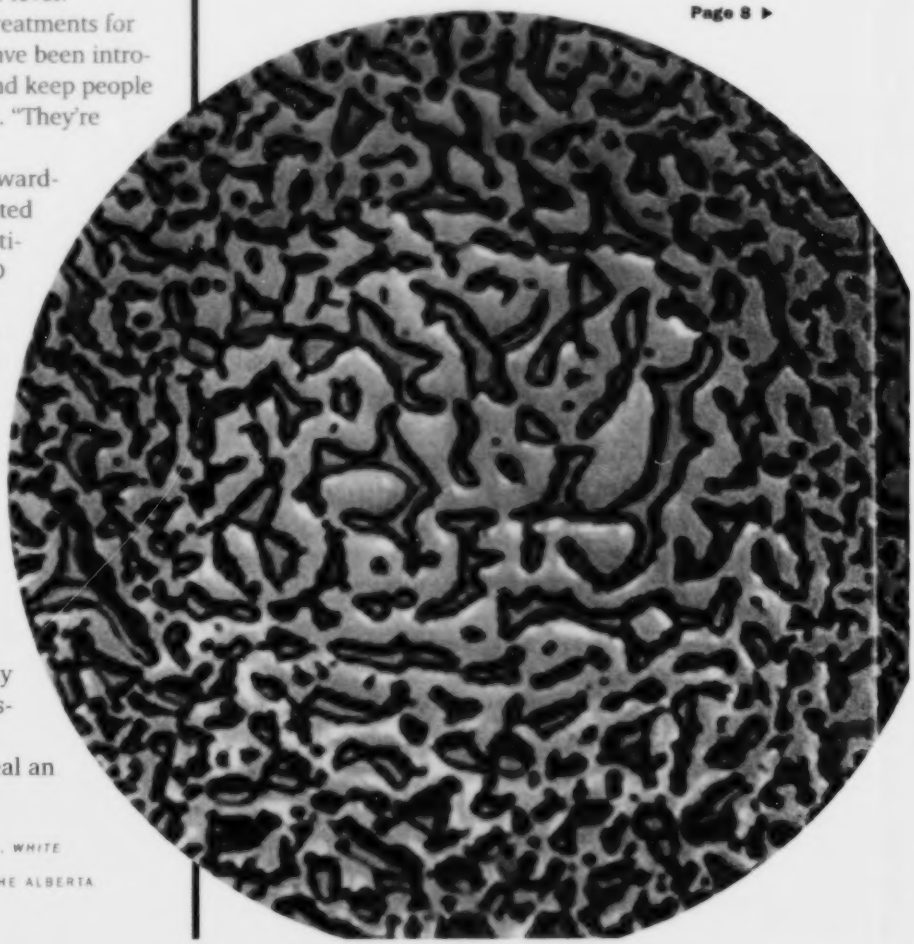


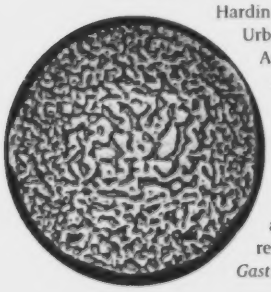
ARTWORK: JOHN CHALKE *ROUND BLACK, ORANGE, WHITE MOTTLED WALL PLATE*. FIRED CLAY AND GLAZE. 25.2 X 25.2 X 4.5 CM. 2000. COLLECTION OF THE ALBERTA FOUNDATION FOR THE ARTS

Diseases of the gut

had also experienced changes in the gut due to their medications. He has since further observed that some transplant patients on anti-rejection therapies seem to develop symptoms that are similar to those of celiac disease, and others develop symptoms similar to Crohn's disease. Dr. Beck and his team are now investigating the mechanisms by which these drugs affect inflammation in the gut to see what more they can learn about this issue.

Dr. Paul Beck is an AHFMR Scholar and associate professor in the Division of Gastroenterology, part of the Department of Medicine at the University of Calgary. He also receives support from the Canadian Institutes of Health Research (CIHR).

Selected publications



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ABOVE: DR. PAUL BECK

Gastrointestinal diseases and disorders

Crohn's disease

Crohn's disease is a chronic inflammatory disease of the digestive system that may affect any area of the gastrointestinal tract from the mouth to the anus. Crohn's disease may begin at any age but its onset typically occurs in adolescents. Symptoms include diarrhea and abdominal pain. Individuals with Crohn's may ultimately experience weight loss, fever, poor control of bowel function, anemia, and other health issues. There is no cure.

Ulcerative colitis

Ulcerative colitis is an inflammatory disease of the colon, the lower part of the large intestine. The most common symptoms are blood in the stool, diarrhea, crampy abdominal pain, and anemia. Ulcerative colitis can be treated with rest, proper nutrition, and drugs. In some instances, surgery to remove the colon may be necessary.

Celiac disease

People with celiac disease have an intolerance to the gluten protein found in certain grains, such as barley, rye, and wheat. When they eat these grains, they suffer damage to the small intestine, which may cause chronic diarrhea, weight loss, anemia, fatigue, cramps, bloating, and skin problems. Most people find that their symptoms disappear when they follow a gluten-free diet—though this can be challenging.

nursing research

A SENSE OF THE WHOLE

ER 2005

9

RCH NEWS

nursingresearch

The hot, humid weather. The cramped, crowded waiting room. The worried glances. If Lisa Walker was going to remember something about her mother's chemotherapy sessions, surely these would be the lasting impressions. But they aren't.

Instead, a much more positive memory remains vivid: the nurse who stayed a while after attaching the IV to hold her mother's hand and stroke her arm. Amid all that chaos and desperation, there was someone—a stranger!—who cared about her comfort.

"Nursing is distinct in the health professions because it has at its centre a sense of the whole person—a person who is biological, psychological, and social; a person who exists in the context of family, place, and culture," says Heritage Population Health Investigator Dr. Alexander Clark, a nursing professor at the University of Alberta. "Nursing embraces all that, and then tries to promote health based on an understanding of how these factors influence individuals."

Nursing researchers like Dr. Clark are forging a better understanding of these factors. Their goal is to empower individuals to improve their health. While nursing research in Canada has been hampered by a lack of funding, the situation is improving. More research support is now available through national funding agencies, as well as provincial funders such as AHFMR. In fact, AHFMR support was one of the key reasons Dr. Clark moved to Alberta from Scotland in 2003.

"Funding provided by AHFMR is the envy of many other jurisdictions," he says. "AHFMR has responded to the evidence that health is not determined by biology alone. It supports research that reflects this reality, and bridges the health and social sciences."

For example, Dr. Clark's research program studies the psychosocial, behavioural, and organizational dimensions of heart disease. His particular interest is in vulnerable populations, such as low-income groups, ethnic minorities, and rural residents. They tend to receive less support after the diagnosis of heart disease, and have worse outcomes in the long term. "Even for services that are free, these populations are less likely to use them," says Dr. Clark. "It's called the 'inverse care law'—those who need services the most are the least likely to benefit from them. Ethically, this shouldn't happen. In order to improve service provision, we have to understand more about the needs of these populations. This is the focus of my research: understanding the factors that influence their willingness and capacity to change their health."

Dr. Clark recently began a Heritage-supported study looking at willingness and capacity to change risk factors associated with heart disease. These include diet, exercise, and smoking, as well as social factors such as networking and stress levels.

DR. ALEXANDER CLARK

"WE NEED TO UNDERSTAND HOW THE WORLD ACTUALLY WORKS"

"Change is not simply a matter of convincing people; people often know what changes they should make," he explains. "As health professionals, we need to look at the factors that, day to day, influence a person's capacity to change. There's a complex interplay between individual and larger, structural factors. I want to embrace this complexity. It's not the easy path, but if we're going to change the world, we need to understand how the world actually works—biologically and socially."

DR. KÄRIN OLSON

Understanding fatigue

Heritage Health Scholar Dr. Kärin Olson, a nursing professor at the University of Alberta, is also looking at ways to improve health, but in a completely different area. For the past seven years, Dr. Olson has focused her research on fatigue. In 1999 she began a large study of fatigue in six ill and non-ill populations. The results have allowed her to refine a conceptual framework for fatigue and the related but different concepts of tiredness and exhaustion.

"Tiredness is what you have at the end of the work week, but you're fine by Monday," explains Dr. Olson. "However, some people don't fully recover from tiredness. They experience a gradual loss of stamina. Their sleep patterns change. They become anxious. They notice that they have difficulty concentrating. And they begin to reduce activities and save energy for things that are important. This is

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The influence of gender and culture on health decisions

While the biophysical processes of many diseases are relatively well understood, what happens to your body is only one aspect of disease. "How we experience disease and the decisions we make about managing disease: these are influenced by many other factors," says Heritage Population Health Investigator Dr. Kathryn King, a nursing professor at the University of Calgary. "Gender and cultural differences likely play an important role, and I was eager to try to understand how different perspectives influence health."

Dr. King has turned her idea into a large study examining the influence of culture and gender on how people manage their risk of cardiovascular disease. The current phase of this project received the largest grant from the Social Sciences and Humanities Research Council (SSHRC) given to the University of Calgary in 2005.

Dr. King is interested in understanding how cardiac patients make decisions: what factors influence the choices people make. Gender and culture play important roles in these decisions. For example, cultural background may influence eating habits or health beliefs; gender issues can have an impact on recovery following cardiac surgery and rehabilitation. Current models for the care of cardiac patients don't take these differences into account.

With background work complete, Dr. King's research team is getting set to survey about 1,000 Canadians from different ethnocultural backgrounds. The goal is to identify the factors that influence the choices people make about their cardiovascular health.

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ABOVE: DR. KATHRYN KING

"As a nurse, I'm interested in how people live and how they live well," says Dr. King. "This perspective influences what I want to see as outcomes of this project. By understanding decision processes and where the critical junctures are, we should gain insights into how these inequalities in healthcare develop. The next logical step is to do something about them by designing interventions that lead to practical improvements in health for all people—not just those from the dominant cultural group."

"As a nurse, I'm interested in how people live and how they live well"

Dr. Kathryn King is an AHFMR Population Health Investigator and an associate professor in the Faculty of Nursing and in the Faculty of Medicine's Department of Community Health Sciences at the University of Calgary. She also receives funding from SSHRC and CIHR.

Selected publication

King KM, Ghali WA, Faris PD, Curtis MJ, Galbraith PD, Graham MM, Knudtson ML. Sex differences in outcomes after cardiac catheterization: effect modification by treatment strategy and time. *Journal of the American Medical Association* 2004 Mar 10;291(10):1220-1225.

"SOME PEOPLE DON'T FULLY RECOVER FROM TIREDNESS"

fatigue. Exhaustion is different from fatigue. Exhausted individuals experience a sudden loss of energy, confusion, erratic sleep patterns, emotional numbness, and withdrawal from social activities they previously enjoyed. Exhaustion is extremely serious, and represents almost complete debilitation."

Now that Dr. Olson and her team have worked out the behavioural manifestations of all three conditions, they are developing a way to help healthcare providers diagnose them. "When you look at tiredness–fatigue–exhaustion as a continuum, it's clear that tiredness is more than an aggravation; it could be the beginning of a serious problem," says Dr. Olson. "That's why it's important to be able to accurately identify individuals with these conditions." To facilitate the identification process, the researchers are now trying to correlate the behavioural manifestations of tiredness–fatigue–exhaustion with biological markers such as cortisol (a stress hormone) and blood pressure.

Another aspect of the work is developing interventions to prevent the progression of tiredness to fatigue, and fatigue to exhaustion. The first will be a family-based intervention, based on the observation that patients with families who understand their tiredness report less fatigue. The challenge will be to modify this intervention for individuals without families who can provide support. For those experiencing fatigue, Dr. Olson would like to explore the potential of complementary therapies such as reiki (a hands-on system of healing and stress reduction) to boost energy.

"We're really onto something here, and it's exciting," says Dr. Olson. "I feel honoured that so many vulnerable people–palliative-care patients, and people suffering from depression, chronic fatigue, and cancer–have given their time to tell us what it's like for them. Their contribution is vital to this work."

The importance of social support

Listening to people is also a common thread in the work of Heritage Senior Health Scholar Dr. Miriam Stewart, principal investigator of the University of Alberta's Social Support Research Program. This multi-site, multi-disciplinary research program includes 10 core studies that have attracted approximately $2 million in funding. Her work involves designing and testing interventions that deliver social support to vulnerable populations. Social support is a significant determinant of health and a primary protective factor in the face of stressors and transitions. "We never assume that we know what people need in terms of support," notes Dr. Stewart. "We ask first."

A case in point is an intervention study that targets women smokers living on low incomes. The first phase involved group interviews with low-income

"WE DON'T TAKE A COOKIE-CUTTER APPROACH TO SUPPORT"

DR. MIRIAM STEWART

women to explore their smoking behaviours, the links between smoking and their life experiences, and the supports they need to make positive changes in their health. A support intervention was designed based on this input and is being piloted in 2005 with 150 women in Edmonton, Vancouver, and Winnipeg.

"This is not a conventional smoking-cessation intervention," explains Dr. Stewart. "From previous work, we know that traditional programs do not meet the needs of low-income women smokers. They want a support program that enables them to connect with their peers. They're looking for emotional affirmation and information support."

As a result, the intervention focuses on change rather than smoking cessation. It uses a holistic approach that addresses smoking within the context of women's life situations. For many women in the study this includes poverty, single motherhood, abusive relationships, and a lack of access to services and supports. Support groups of 8 to 12 participants meet once a week for about two hours, over a period of 12 to 14 weeks. The sessions are interactive and include focused discussions, one-on-one counselling, and recreational activities. All support-intervention studies employ multiple methods, both qualitative and quantitative, to document processes and assess impact.

"We don't take a cookie-cutter approach to support," adds Dr. Stewart. "We tailor all our interventions to the vulnerable population, so that it meets their real needs."

Improving the resilience of families

Social support can also factor into a concept called resilience, a key interest of Dr. Jane Drummond, a nursing professor at the University of Alberta. She describes resilience as the interaction between processes that make people vulnerable and those that protect them from becoming vulnerable. In her work with children and families, Dr. Drummond has led numerous studies that have investigated elements of resilience and developed interventions that improve resilience. Over the years, she has become increasingly interested in breaking down the barriers that prevent promising research results from being widely adopted.

Dr. Drummond notes that barriers exist on both the individual level and on the service-delivery side. "When working with families, we need to be doing more than just giving people information. We need to help people develop communicative literacy, which involves problem-solving and co-operative communication skills. Parents need to learn the language and the communication techniques to help them navigate through the system." And as for getting help to these families, the challenges may be even greater. "We don't need to create more services; rather, we need to remove barriers by integrating services and promoting collaboration among providers."

Dr. Drummond's newest study addresses these fundamental issues. Families First Edmonton is a

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"WE NEED TO REMOVE BARRIERS"

DR. JANE DRUMMOND

nursingresearch

Creating, using, and sharing knowledge

In her 26-year nursing career, University of Alberta nursing professor Dr. Joanne Profetto-McGrath has been a staff nurse, nurse educator, middle manager, and researcher. "These are very different jobs," she explains, "but there's one thing that has always been at the forefront of what I do: quality patient care. The question for me is 'What can I do as a nurse to make my practice the best it can be, making use of what I know and what research tells me is best practice?'"

It's not surprising that Dr. Profetto-McGrath's research focuses on building the capacity of nurses to create new knowledge, as well as to use the knowledge coming from research and share it with others. She recently completed a pilot study examining the role of clinical nurse specialists in knowledge use and transfer. (A clinical nurse specialist is a registered nurse, usually with a graduate degree, who is an expert clinician in a specialized area of nursing practice.) The pilot study, done in the Edmonton region, is now being followed up with a nationally funded study of the approximately 300 clinical nurse specialists in Alberta.

"Clinical nurse specialists are respected sources of knowledge"

"Clinical nurse specialists are respected sources of knowledge," says Dr. Profetto-McGrath. "They have the power to influence the uptake of research into regular nursing practice. We want to know more about how they access knowledge, who comes to them for information, and what barriers there are to the transfer process.

"I suspect that clinical nurse specialists are key players in knowledge utilization and transfer, but to date very little research has been done on their role. We need to find out more, with a view to helping them do their jobs better and ultimately improving patient care."

Dr. Joanne Profetto-McGrath is an associate professor in the Faculty of Nursing at the University of Alberta. She is the recipient of an AHFMR career renewal award, and also receives funding from the Canadian Health Services Research Foundation (CHSRF), CIHR, the Canadian Nurses Foundation, and Capital Health.

Selected publication

Profetto-McGrath J, Hesketh KL, Lang S, Estabrooks CA. A study of critical thinking and research utilization among nurses. *Western Journal of Nursing Research* 2003;25(3):322-337.

ABOVE: DR. JOANNE PROFETTO-MCGRATH

6-year, $10-million study (which includes a $3.6-million research component) designed to advance knowledge about service integration interventions that enhance the well-being of low-income families and children. The project will enroll 1,200 families that have been on social assistance for at least one year. Each family will be randomly assigned to one of four service packages: (1) self-directed service integration in addition to existing social assistance services; (2) primary healthcare in addition to existing social assistance; (3) recreation coordination in addition to existing social assistance; and (4) a comprehensive package including both recreation coordination and primary healthcare. The project involves 12 community partners—provincial and municipal government departments, private funders, and service agencies—as well as 15 researchers.

"We absolutely must address the system-level challenges faced by low-income families. I'm excited by the possibilities of this new study," says Dr. Drummond.

"I call this the 'glue work'—bringing people together in order to be truly effective. Nurses are well-positioned to do this because we take a holistic view of the individual and the social environment, we have an understanding of other professionals' work, and we link people together."

DR. MARLENE REIMER

Quality of life and eating disorders

"Research is like detective work," says University of Calgary nursing professor Dr. Marlene Reimer. "I really enjoy the numbers—seeing the data and figuring out what they mean."

And it won't be long before Dr. Reimer gets her hands on new data. Along with co-principal investigator Dr. Carol Adair, she is investigating the quality of life of adolescents and young adults suffering from eating disorders such as anorexia and bulimia. The team has developed a questionnaire intended to evaluate treatment for these disorders and is currently piloting it in Alberta before it goes nationwide in the fall. The questionnaire was developed with input from eating-disorder experts—health professionals as well as those suffering from eating disorders.

The quality-of-life approach is fundamentally different from evaluating treatment by looking at symptoms and how they are affected by treatment. "We broaden the focus, looking at what's important in the lives of young people. It's positive, and doesn't focus just on weight issues or eating patterns," explains Dr. Reimer.

This is the third quality-of-life evaluation tool that Dr. Reimer has developed. "These tools give a voice to people who aren't usually asked. Yet it's the people who are living day to day with these conditions who know the most about them. My hope is that by taking a quality-of-life approach, we can develop better treatments and make a difference in people's lives."

"RESEARCH IS LIKE DETECTIVE WORK"

Dr. Reimer notes that this broader approach to studying health is a hallmark of nursing research. "The reality is that people live with multiple diseases [comorbidities]. A stroke patient who is depressed and suffers from arthritis is just one example. Nurses have to deal with the muddy comorbidities and socio-cultural differences in their practices. It's not surprising that our research reflects this reality. We see the world as a complicated place and resist breaking it into parts. It's the connections that count."

Dr. Alexander Clark is an AHFMR Population Health Investigator and an assistant professor in the Faculty of Nursing at the University of Alberta. He also receives funding from the Canadian Institutes of Health Research (CIHR), the Chief Scientist Office of the Scottish Executive Health Department, Have a Heart Paisley, and the British Heart Foundation.

Dr. Kärin Olson is an AHFMR Health Scholar, an associate professor in the Faculty of Nursing, and a scientist at the International Institute for Qualitative Methodology at the University of Alberta. She also receives funding from the National Cancer Institute of Canada (NCIC).

Dr. Miriam Stewart is an AHFMR Senior Health Scholar and a full professor in the faculties of Nursing and Medicine at the University of Alberta. She is scientific director of the Institute of Gender and Health (one of the 13 Canadian Institutes of Health Research). In 2004 Dr. Stewart received the University of Alberta's J. Gordin Kaplan Award for Excellence in Research. Funding for projects in the Social Support Research Program come from many sources, including AHFMR; AADAC; the Canadian Health Services Research Foundation (CHSRF); CIHR; Health Canada; the Social Sciences and Humanities Research Council of Canada (SSHRC); the United Way of Alberta; the Boyle McCauley Health Centre; the Capital Care Group; and the Edmonton Community Lottery Board. Dr. Stewart also receives funding from the Health Research Fund, which is administered by AHFMR on behalf of Alberta Health and Wellness.

Dr. Jane Drummond is vice-provost of the Health Sciences Council, and a full professor in the Faculty of Nursing at the University of Alberta. She receives funding from AHFMR, CHSRF, and CIHR. She is also university co-chair of the Community-University Partnership for the Study of Children, Youth, and Families.

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nursing research

Women and heart disease

Although there have been substantial medical advances that improve outcomes for people with heart disease, the reality is that women just don't do as well as men after treatment. Women consistently report worse quality-of-life outcomes—the key finding of research done by Dr. Colleen Norris for her Ph.D. in epidemiology at the University of Alberta. While some have tried to explain away this finding (for example, by suggesting that women are sicker than men when they present with heart problems), Dr. Norris notes that her research team was able to adjust for these factors. "After risk adjustment, gender remained independently associated with quality-of-life outcomes. The differences between men and women are very relevant to care. It might be that men and women require different approaches to get the maximum benefit from treatment for heart disease. We need to understand why these differences exist."

"The differences between men and women are very relevant to care"

Now a Heritage Population Health Investigator and nursing professor at the University of Alberta, Dr. Norris is following up on her Ph.D. research. Conversations with her colleague Dr. Kathleen Hegadoren, a specialist in depression, gave Dr. Norris an idea about where to start: Women are three times more likely to suffer depression after a heart attack, so it's possible that the difference in the quality-of-life outcomes has to do with depression.

The research involves a quality-of-life survey, screening for depression, physiological monitoring, and qualitative studies of both men and women who are registered in the Alberta Provincial Project for Outcome Assessment in Coronary Heart Disease (APPROACH). The project's database includes all Alberta residents undergoing cardiac catheterization (a procedure that identifies possible problems with the heart or its arteries).

"My feeling is that gender differences in heart disease is an onion we're just starting to peel away," says Dr. Norris. "It may turn out that depression is not the main factor; it could be coping mechanisms or stress appraisal. Whatever the cause, we need to find out what is going on in order to make a difference in clinical practice."

Dr. Colleen Norris, an AHFMR Population Health Investigator, is an assistant professor in the Faculty of Nursing and adjunct professor with the Faculty of Medicine at the University of Alberta. She also receives funding from CIHR and the Heart and Stroke Foundation.

Selected publication

Norris CM, Ghali WA, Galbraith PD, Graham MM, Jensen LA, Knudtson ML, and the APPROACH Investigators. Women with coronary artery disease report worse health-related quality of life outcomes compared to men. *Health and Quality of Life Outcomes* 2004 May 5;2(1):21.

ABOVE: DR. COLLEEN NORRIS

Dr. Marlene Reimer is a full professor in the Faculty of Nursing at the University of Calgary. Her study "Development, validation and field testing of a quality of life measure for adolescents and young adults with eating disorders" is funded by the Health Research Fund, administered by AHFMR on behalf of Alberta Health and Wellness.

Selected publications

Olson K, Tom B, Hewitt J, Whittingham J, Buchanan L, Ganton G. Evolving routines: preventing fatigue associated with lung and colorectal cancer. *Qualitative Health Research* 2002 May;12(5):655-670.

Stewart M, Barnfather A, Neufeld A, Warren S, Letourneau N, Liu L. Accessible support for family caregivers of seniors with chronic conditions: from isolation to inclusion. *Canadian Journal on Aging* 2005. In press 2005.

Drummond J, Fleming D, McDonald L, Kysela GM. Randomized controlled trial of a family problem-solving intervention. *Clinical Nursing Research* 2005 Feb;14(1):57-80.

Reimer MA, Slaughter S, Donaldson C, Currie G, Eliazsiw M. Special care facility compared to traditional environments for dementia care: a longitudinal study of quality of life. *Journal of the American Geriatrics Society* 2004;52(7):1085-1092.

Focus on families

For many nursing researchers, it's all about context. Children don't grow up by themselves, so it only makes sense to study children in the context of their families. Two innovative, Alberta-based research projects are doing just that.

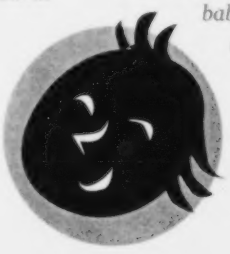
At the University of Calgary, nursing professors Dr. Lorraine Watson and Dr. Dianne Tapp are trying to understand weight management from a family perspective. Their project looks at three groups of families: (1) families with at least one overweight member in a weight-loss program, (2) families with an overweight member who does not follow a formal program, and (3) families in which all members are of normal weight.

Although participants are still being sought for this study, the researchers were able to share some preliminary observations. "I think that one of the most striking things so far is the number of parents who are really quite fearless in pushing the norms about parenting," says Dr. Tapp. "We've seen people being very strategic with things like limiting computer and TV time, and involving children in food preparation. Families who are struggling more tend not to have parents who are firm around these issues."

Fathers interact differently with babies

"I think this is the kind of study that will yield much more than formal academic papers," adds Dr. Watson. "Based on what people tell us works for them, we should be able to develop some guidelines for parents that will be useful to families who are struggling with weight issues."

At the University of Alberta, Dr. Joyce Magill-Evans (Faculty of Rehabilitation Medicine) and Dr. Margaret Harrison (Faculty of Nursing) have collaborated for years on studies of children and families. From their experience, they knew that most parenting information is aimed at mothers. From other research, they knew that fathers interact differently with babies. Put the two together and you have the inspiration for one of their current studies: Could they do something that would help first-time dads feel more comfortable and confident with their babies?



The upshot of that question was a study of 150 first-time fathers in Edmonton and Calgary. The participants were divided into two groups. Each father was videotaped while teaching his healthy five-month-old baby a new skill, such as moving a block. One group of fathers (the intervention group) then reviewed the video with a home visitor, who pointed out positive aspects of the interaction and made suggestions; they also received a handout related to infant cues and teaching. The intervention was repeated one month later. The second group (the control group) had a single visit and discussed a list of toys and playing with the baby. Follow-up visits occurred at eight months for both groups.

University of Calgary nursing professor Dr. Karen Benzies coordinated the study in Calgary. "We are now analyzing the data to assess differences in the quality of interaction between the two groups. The preliminary results look promising. This research is extremely labour- and time-intensive. It requires training, home visits, and hours of videotape analysis. But the intervention itself is straightforward. If it proves effective, it could easily be done during a public health nurse's home visit for fathers who want or need feedback."

Dr. Lorraine Watson and Dr. Dianne Tapp are associate professors in the Faculty of Nursing at the University of Calgary. Their study ("Societal and family influences on weight management") is funded by the Health Research Fund, administered by AHFMR on behalf of Alberta Health and Wellness.

Dr. Karen Benzies is an associate professor in the Faculty of Nursing at the University of Calgary and holds a postdoctoral fellowship from CHSRF. Her study ("Fathers and babies: Effects of a brief intervention on father's skills and sense of competence") is also funded by the Health Research Fund.

Selected publication

Benzies KM, Harrison MJ, Magill-Evans J. Parenting stress, marital quality, and child behaviour problems at age 7 years. *Public Health Nursing* 2004;21(2):111-121.

TOP: DR. DIANNE TAPP (LEFT) AND DR. LORRAINE WATSON BOTTOM: DR. KAREN BENZIES

Academic institutions are not the only places where nursing research is flourishing in Alberta.

THE SEARCH CONNECTION

Since 1996 an innovative program called SEARCH (Swift Efficient Application of Research in Community Health) has trained practising health professionals in the how-tos of applied health research so they can ask and answer questions about priority health issues in their own communities. And nurses in the workforce are eager to learn, making up approximately 50% of SEARCH participants.

"SEARCH is a wonderful source of continuing education for nurses," says Sarah Hayward, the program's CEO and a former nurse herself. She explains that because formal research training in the field of nursing has quite a short history, many nurses currently practising did not receive research training as part of their education. In addition, after they've been in the workforce for a while, nurses—particularly those in remote areas—often don't have the opportunity to access the next step in research education. SEARCH provides that opportunity.

Dr. Sheila Evans agrees. "A lot of nurses may have had a little bit of research in an undergraduate-level statistics course," explains the SEARCH faculty member and associate dean of research at the University of Calgary Faculty of Nursing. "But they haven't learned about the organizational factors that go into implementing research, and they haven't learned the technical skills that allow them to produce reliable evidence for their organizations. Nurses have tremendous potential to contribute in this way. SEARCH allows them to have a much broader scope of practice, rather than strictly as care providers."

Nurses and former SEARCHers Chris Jensen-Ross and Sharon Yanicki can attest to this fact. Their SEARCH project showed that the practice of discharging mothers and babies from hospital within 24 to 48 hours of birth (a practice which was new and controversial at the time of the study) was safe for normal newborns when timely home visits were provided. "The research we did made a real difference to healthcare practice at a local level," says Yanicki.

SARAH HAYWARD

And the research and learning continue beyond the formal SEARCH program. Nancy Stocker followed up on the early discharge study with her own SEARCH project on nursing care and its effects on patient outcomes. She investigated

SHARON YANICKI (LEFT), CATHERINE O'DONNELL AND BABY HANNAH (CENTRE), AND CHRIS JENSEN-ROSS (RIGHT)

NURSES IN THE WORKFORCE ARE EAGER TO LEARN

the relationships between prenatal education, the care new mothers receive after childbirth, the timing of discharge, and mother-and-infant visits to emergency rooms and readmission to hospital within the first few weeks after childbirth. Two years after completing SEARCH, Stocker continues to pursue her project, hoping that her work will contribute to improved health practices.

The current group of SEARCH participants includes nurses with an average of 10 to 15 years of front-line clinical experience; and middle and senior managers with 5 to 10 years of management experience on top of their years of clinical practice. "These people are mid-career, highly experienced, and experts in their fields," says Hayward. "They're very well positioned to influence their colleagues and their workplace cultures. They come to SEARCH because of their commitment to improving the health system."

After nine successful years operating under the umbrella of AHFMR, the SEARCH program has evolved into SEARCH Canada. The new, not-for-profit initiative is governed and funded by its member organizations–which include AHFMR, Alberta's nine health regions, and the University of Calgary–with support from Alberta Health and Wellness through the Health Research Collaboration agreement. SEARCH Canada will sustain and enhance current programs in Alberta while responding to requests for expanded access to SEARCH programs both in Alberta and across Canada.

Research use in nursing

Healthcare researchers spend countless hours and dollars looking for the answers to questions that will lead to improved healthcare and quality of life for Albertans. But the real question may be whether or not healthcare practitioners actually use this research when caring for their patients.

AHFMR doctoral student Shannon Scott-Findlay, in collaboration with her supervisor, Canada Research Chair Dr. Carole Estabrooks, studies how nurses use research. Much of her work indicates that the environment in which nurses work shapes their use of research.

A former lecturer at the University of Manitoba and nurse at Winnipeg Children's Hospital, Shannon noticed an interesting phenomenon during her teaching days. "Research is a big part of the teaching process, and I was always pushing my students, asking them 'What does the latest research say?' I think research is an important part of knowledge. Yet, when I worked with these same students clinically, after they had graduated, research fell off the radar screen. And I was really intrigued as to why that happens."

That was the impetus for Shannon's research and her study of work environment and its impact on nurses. "The majority of healthcare professionals work in large units, and they spend an enormous amount of time there," she says. "Obviously, the values in that environment influence how people work." Shannon spent seven months studying a critical care unit at the Stollery Children's Hospital in Edmonton, and she notes that certain behaviours are considered acceptable for nurses, while others are not. "There is a very strong value for nurses to 'do', to look busy. Thinking and reflecting are not always valued. For example, is it seen as work to be reading a journal article? Or will someone speak negatively about you for doing that? It's particularly interesting given that research is such an integral part of a physician's work, and nurses and doctors work in such close proximity. Yet the expectations of the two jobs are extremely different."

Shannon's work provides strong evidence that the culture of 'doing' in a nursing environment strongly shapes how the nurses use research. In other words, many nurses report that they do not use research, because it is not viewed as being an important part of their jobs. Shannon intends to continue this inves-

ABOVE: SHANNON SCOTT-FINDLAY

tigation as part of her post-doctoral work–implementing an organization-level intervention designed to help nurses and other healthcare professionals use research. Her future plans include building a program of research that focuses on research transfer in child-health settings, with a view to improving pediatric outcomes.

Balance between career and family

Now close to obtaining her Ph.D., Shannon stresses that Alberta was not only the best province in Canada in which to get her doctoral training, but also the best place for her and her husband to raise their three young children. "I strongly believe that Alberta is the only province in the country where I wouldn't have to make the choice between pursuing my career and being a mother, because of the level of funding that AHFMR is able to provide," she says. "I didn't have to make that choice, and I am forever grateful for that."

AHFMR Student Shannon Scott-Findlay is a Ph.D. candidate in the Faculty of Nursing at the University of Alberta, and a trainee at the Centre for Knowledge Transfer. She has also received the Andrew M. Stewart Memorial Graduate Prize for Excellence in Research from the University of Alberta and holds a health professions fellowship from the Canadian Institutes of Health Research (CIHR).

Selected Publications

Estabrooks CA, Rutakumwa W, O'Leary KA, Profetto-McGrath J, Milner M, Levers MJ, Scott-Findlay S. Sources of practice knowledge among nurses. *Qualitative Health Research* 2005 Apr;15(4):460-476.

Scott-Findlay S, Pollock C. Evidence, research, knowledge: a call for conceptual clarity. *Worldviews on Evidence-Based Nursing* 2004 June;1(2):85-90.

Correction

Geoff Bennett (left) and Tim Davies (right) were incorrectly identified in this photo in the spring 2005 issue of *AHFMR Research News*.

reader resources

Research views

University of Alberta Faculty of Nursing
http://www.nursing.ualberta.ca/

University of Calgary Faculty of Nursing
http://www.ucalgary.ca/NU/

University of Lethbridge School of Health Sciences
http://www.uleth.ca/hlsc/

Responding to the reader

University of Calgary Department of Cell Biology and Anatomy
http://www.cell.ucalgary.ca/welcome.html

Shoulder pain

University of Calgary Sports Medicine Centre
http://www.sportmed.ucalgary.ca

Diseases of the gut

University of Calgary Gastrointestinal Research Group
http://www.ucalgary.ca/~girg/

Nursing research: a sense of the whole

American Heart Association
http://www.americanheart.org

University of Alberta Social Support Research Program
http://www.ssrp.ualberta.ca

Community-University Partnership for the Study of Children, Youth, and Families
http://www.cup.ualberta

Alberta Area Health Education Partnership Program
http://www.familiesfirst-edmonton.ualberta.ca

Dr. Joanne Profetto-McGrath's web page
http://www.nursing.ualberta.ca/homepage.nsf/name/Profetto-McGrathJoanne

University of Alberta Knowledge Utilization Studies Program
http://www.nursing.ualberta.ca/kusp

Centre for Knowledge Transfer
http://www.ckt-ctc.ca

Dr. Karen Benzies' web page
http://www.ucalgary.ca/NU/scholarly/benzies.htm

APPROACH (Alberta Provincial Project for Outcomes Assessment in Coronary Heart Disease
http://www.APPROACH.org

Nursing research: the SEARCH connection

SEARCH Canada
http://www.searchca.net

Sana Chaker didn't know what she was going to do this summer . . . until she heard about the HYRS program. When her biology teacher told Sana's class about AHFMR's hands-on summer research program for grade 11 students, everything suddenly became clear. "It seemed like HYRS was exactly what I wanted to spend my summer doing; it was another challenge I wanted to experience," she says.

In July, Sana began work in the lab of Heritage Scholar Dr. Andrew Simmonds at the University of Alberta. Dr. Simmonds studies the regulation of genes through controlling the movement of specific RNA within the cell. A previous mentor in the WISEST (Women in Scholarship, Engineering, Science and Technology) program, Dr. Simmonds is participating in HYRS for the first time. He enjoys bringing high school students into the world of science. "I'm a firm believer that the more you can push science out into the community, the more it will pay dividends in the long run for the university and the province," he says.

"These kids are bright, motivated, and hardworking, and they bring up the general atmosphere in the entire lab just because they're so keen and interested."

Sana is no exception. Interested in biology but not yet sure what area she would like to pursue, Sana sees the HYRS program as an important step in choosing an education and career path. "Often we hear about current research and scientific findings, but we don't consider the long, hard work done by researchers," she points out. "I hope that, through this program, I will gain an even greater appreciation for science and research."

ABOVE: SANA CHAKER AND DR. ANDREW SIMMONDS

Sana is one of 45 high-school students participating in the 2005 HYRS program. More than 212 students applied to the program, representing 96 schools throughout the province. To qualify for HYRS, students must have an 85% average in the required math and science subjects, obtain two teacher references and one community reference, and write an essay on an assigned topic. Applications are judged by a committee of high-school science teachers.

For more information about the HYRS program, please go to the AHFMR Web site at www.ahfmr.ab.ca and click on "For Students".

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